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A REVISION OF THE NORTH AMERICAN SPECIES OF MEGASTIGMUS DALMAN.

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The genus *Megastigmus* was founded by Dalman in 1820 (Svensk. Vet.-Akad. Handl. XLI, p. 178) as a subgenus of *Torymus* to contain the three species: *bipunctatus* Swederus, *collaris* and *chloronotus*. *Collaris* was described by Boheman after Dalman's death in 1833 (Svensk. Vet.-Akad. Handl., p. 332). *Chloronotus* was never described but Boheman placed it under *Torymus* (*Megastigmus*) *dorsalis* Fabricius (l. c. p. 334). The type of the genus therefore cannot be *M. dorsalis* as stated by Ashmead (Chalcis-flies, p. 380, 1904) but must be *M. bipunctatus* Swederus since that is the only one of the three species cited by Dalman which was described at that time.

Megastigmus is distinguished from other *Torymidæ* occurring in North America by the enlarged and pigmented stigmal club and by the presence of a well developed basal vein. The posterior tibiæ have two well developed apical spurs as in other *Torymidæ*; Ashmead's table to the subfamilies (Chalcis-flies, p. 236, 1904) is in error on this point, and this mistake has been copied by Schmiedeknecht in *Genera Insectorum*, fasc. 57, p. 118, 1909. The mandibles have three teeth. The scutellum has a fine cross furrow as in *Syntomaspis*. The ovipositor, except in two species, is longer than the abdomen, slender and gently curved upward. The coloration in the American forms is never metallic; usually yellowish brown or opaque blackish.

As far as known the larvæ of all our species live in the seeds of plants.

FEMALES.

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Megastigmus brevicaudis Ratzeburg.

Megastigmus brevicaudis Ratzeburg. Ichneum. Forstinsect., III, p. 225. 1852.

Megastigmus brevicaudis Rodzianko. Comment. Torm., pp. 608-611. 1908.

Megastigmus brevicaudis Crosby. Cornell Exp. Sta. Bull., 265, pp. 375-377, Figs. 77-79. 1909.

Megastigmus brevicaudis Rohwer. U. S. Bur. Ent., Tech. Bull. 20, pt. VI, p. 159. 1913.

Female.—Length, 2.4 mm.; abdomen, 1 mm.; ovipositor, .7 mm.

Face, cheeks and a partial ring around eye yellow. Vertex and occiput very dark brown, nearly black. Vertex finely transversely rugulose.

Prothorax yellowish, indistinctly marked with dusky on the sides. Rest of the thorax nearly black with a dull yellowish tinge showing through on the scapulæ and scutellum. Antennæ brownish yellow, scape and pedicel black above and yellow beneath. Anterior coxæ yellow; middle and hind coxæ brownish; rest of legs light yellowish. Wings hyaline; stigmal club not surrounded by a clouded area.

Abdomen brownish on the sides, nearly black above. Ovipositor short, dark brown.

Described from 1 ♀, Ratzeburg's type. I have three females reared by W. N. Rodzianko from the seeds of *Sorbus aucuparia* at Poltawa, Russia, which agree very closely with the type.

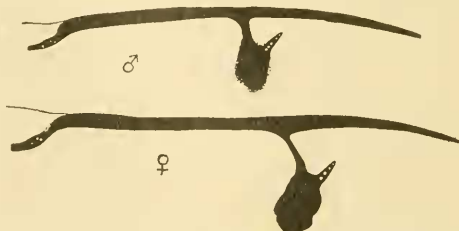


Fig. 1. *Megastigmus brevicaudis*.

Through the kindness of Mr. A. G. Hammar I received some *Sorbus* berries from Sweden from which 5 females were reared. In these specimens the head is black with the face dark honey-yellow. Prothorax honey-yellow, rest of thorax black. Antennæ very much darker than in the type. Abdomen black with brownish bars on the sides. Rodzianko states that he has never been able to rear the male.

I have reared this species abundantly from the seeds of *Sorbus* in New York State. The American specimens are slightly smaller than those from Europe and vary greatly in color, but I have been unable to find any constant character by which they may be separated. The darker individuals are very close to the typical form. A large proportion of the specimens are of uniform brownish yellow. The legs are light yellow and the antennæ and ovipositor are brownish. Between these and the typical form all gradations occur.

Male.—Length, 1.7 to 2.1 mm.; abdomen, .7 to .8 mm. All the males reared are much darker than the females. The face and cheeks are yellow; the legs dull yellowish and the antennæ more yellowish than in female. Head and thorax black except a small spot on each side between the ocelli and the eyes and an area on the lateral aspect of the prothorax, which are brownish yellow. Stigmal club surrounded by a very narrow clouded area.

Abdomen compressed, seen from the side, elongate triangular, rounded behind, brown-black above and yellowish brown beneath and at apex.

The larva is white, and its mandibles have four teeth on the inner margin.

In addition to rearing the adult insect at Ithaca, infested berries of the Mountain Ash have been found at Weedsport, Jamesville and Wayland, N. Y.

In the National Museum collection is a female specimen from Mt. Washington bearing Ashmead's manuscript name *Megastigmus slossonæ* which agrees exactly with the lighter specimens reared from *Sorbus* seeds from New York State. In the National Museum there is also a very dark ♀ from Oswego, N. Y., 1 July, 1897.

As suggested by Mayr. (Verh. zool.-bot. Ges. Wien, XXIV, p. 139. 1874) this species may be the same as *M. bipunctatus* Boheman.

Megastigmus physocarpi n. sp.

Female.—Length, 1.8 mm.; abdomen, .8 mm.; ovipositor, .8 mm.

Head and prothorax yellow, rest of thorax and abdomen brownish yellow, the latter much darker. Head and prothorax delicately transversely rugulose; mesothorax with a more pronounced sculpture; propodeum closely but distinctly reticulate, a distinct median carina present. A brownish line connects the ocelli.

Scape yellow; pedicel dusky above, yellow beneath, rest of antennæ dusky. Legs including coxæ light yellow. Wings hyaline. The stigmal club is narrow and elongate; not surrounded by a clouded area.

Most of the females agree with this description but there are three specimens in which the ovipositor is not over half the length of the abdomen. In these specimens the prothorax has a median black stripe narrower behind and the rest of the thoracic dorsum is black except the scapulæ and the posterior part of the propodeum.

Male.—Length, 1.6–1.9 mm.; abdomen, .7 mm.

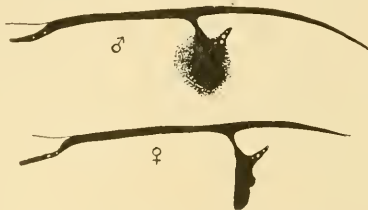


Fig. 2. *Megastigmus physocarpi*.

Similar to the female in color except the abdomen is more or less dark brown above, the antennæ are paler and the brown line connecting the ocelli is lacking. Stigmal club surrounded by a dark, nearly circular clouded area.

There are three males marked with black like the females with the short ovipositor. The abdomen is nearly black above except at tip.

Described from 15 females and 6 males from Allentown, Mo., October, 1893, and 1 male from Kirkwood, Mo., 1 July, 1895. All reared from *Physocarpus opulifolius*, probably from the seeds.

Megastigmus nigrovariegatus Ashmead.

Megastigmus nigrovariegatus Ashmead. Bull. Colorado Biol. Association, I, p. 26. 1890.

Megastigmus nigrovariegatus Cockerell. Bull. 15, Ariz. Exp. Sta., p. 69, 1895.

Megastigmus aculeatus Crosby. (in part.) Cornell Agr. Exp. Sta., Bull. 265, pp. 377–379. Figs. 82, 83, 1909.

Female.—Length, 3.4 mm.; abdomen, 1.6 mm.; ovipositor, 2.5 mm.

Vertex, antennal grooves and a spot above clypeus dark brown; face and anterior and dorsal eye margin dull brownish yellow; cheeks, posterior eye margin and occiput shining brownish.

Prothorax bright yellow posteriorly and on the sides, brownish in front on the lateral angles and just above the front coxæ. Mesonotum

brownish yellow, dark brown in front. Mesopleuræ brown. Post-scutellum yellow in the middle, brown on the sides; scutellum brown in front of the furrow, yellow behind. Propodeum brown, finely reticulate punctate, with a pair of strongly curved carinæ most distinct posteriorly marking off a nearly circular central area.

Scape and pedicel yellow beneath, rest of antennæ dark brownish. Legs pale yellow; posterior coxæ at base brownish; posterior femora slightly tinged with brownish. Wings hyaline; stigmal club surrounded by a distinct oval cloud.

Abdomen brownish above, sides brownish yellow, indistinctly marked with darker brownish. Ovipositor black.

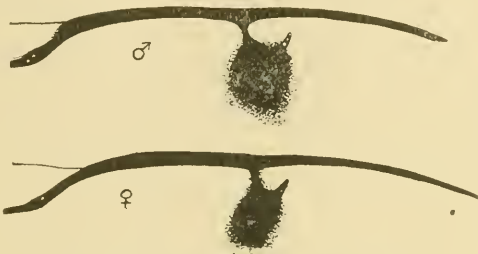


Fig. 3. *Megastigmus nigrovariegatus*.

Described from one ♀, Vancouver Island, a paratype.

In some specimens the yellowish band around the eye is complete. Sometimes the brownish area above the clypeus is lacking and the posterior femora are entirely yellow.

Male.—Length 2.8-3mm.; abdomen .9-1.4mm. (Measurements taken from alcoholic specimens). The males vary greatly in size and color. The lighter males resemble the females closely in color. Sometimes the head is all yellow except the upper half of the occiput, in others it is black except the face and portions of the ring around the eye. In some the thorax is as light as in a female, while in others it is nearly black except an irregular area on the disk and two greenish yellow spots near the posterior margin of the pronotum. In most of the males the propodeum is dark brown to black, but in the lightest specimens it is yellow. In the darkest specimens the abdomen is nearly black except the yellow tip. In the light specimens the legs are yellow, in the dark ones they are more or less brownish on the femora and tibiae. Stigmal club much larger and darker than in female and surrounded by a clouded area.

In the National Museum collection in addition to the paratype and 4 ♀ ♀ from Vancouver Island are the following specimens belonging apparently to this species. 1 ♀, Algonquin, Ill., June 27, 1894. Labeled "Type, *Megastigmus illinoënsis* Ash." 3 ♀, Jamaica Plain, Mass. (J. G. Jack). 1 ♀, Natrona, Pa.

1 ♀, Pullman, Wash., 30, June, 1898 (C. V. Piper) "Reared from *Clisiocampa plumalis*." This specimen is imperfect, having lost the abdomen and may not belong here.

Cockerell captured specimens of this species on rose hips in Arizona and suggested that they may possibly breed in them. I have reared this species abundantly from rose seeds from Ithaca, White Church, and Wellsville, N. Y., Waukegan, Ill., Durham, N. H. (Charles Spooner), Boston, Mass. (Ralph Curtis), Provo, Utah (R. V. Chamberlin), and Newark, Del. (C. O. Houghton). Professor J. G. Sanders sent me specimens reared from the seeds of *Rosa rugosa*, at Madison, Wis. Mr. Nathan Banks has sent me 9 specimens reared from rose hips at Falls Church, Va.

Some of these localities are listed under *M. aculeatus* in Cornell Exp. Sta. Bull. 265 because at that time I had not separated these two species. It is probable that *nigrovariegatus* is the native American species infesting rose seeds and that *aculeatus* has been introduced recently, since I have reared it from material collected at Ithaca only.

Megastigmus pinus Parfitt.

Megastigmus pinus Parfitt. Zoologist, pp. 5543, 5545, 5629. 1857.

Megastigmus pinus Rohwer. U. S. Bur. Ent., Tech. Bull. 20, pt. VI, p. 160. 1913.

Female.—Length, 4 to 5 mm.; abdomen, 2.3 mm.; ovipositor, 5 to 5.5 mm.

Vertex and occiput black; face, cheeks and a ring around eye yellow, the latter broadly interrupted by the black of the vertex which attains the eye-margin below the level of the front ocellus; antennal furrows black; below the insertion of the antennæ there is a circular area cut off from the rest of the face by two or four brownish spots, very variable in shape and distinctness; hairs on the face light colored, above the base of antennæ, brown. Vertex and front transversely rugulose; cheeks and lower part of occiput smooth; face with lines radiating from the clypeus.

Prothorax black, with the sides and a large posterior dorsal band greenish yellow; this band is usually biconvex in front. Mesothorax black with an oblong reddish orange area covering the posterior half of the middle lobe, the inner angles of the scapulæ and axillæ and all of the scutellum. In some small specimens this orange area is obscured by blackish in the center. Sculpture of mesonotum distinctly transversely rugulose. Scutellum with the transverse stria distinct. Pleuræ black, scapulæ have a large greenish yellow spot in front of tegulæ. Postscutellum black with a transverse median band of light yellow. Propodeum black, irregularly rugose with a delicate median carina.

Scape yellow below, black above; pedicel black above, paler at tip beneath; rest of antennæ brownish. Front coxæ yellow; middle coxæ yellow in front, black behind; hind coxæ black; legs yellowish, the middle and hind pairs successively darker; a brownish stripe on outside of posterior femora. Spines on posterior tibiæ white and small. Wings hyaline, no cloud surrounding stigmal club.

Abdomen strongly compressed. Segments 2, 3 and 4 brownish black above, polished; rest of abdomen yellow to yellowish brown with a row of large brownish black spots on each side; segment 8 and ventral keel brownish black. Ovipositor brown and strongly curved.

Male.—Length, 3 mm.; abdomen, 1.3 to 1.9 mm.

Head marked as in female but there are no brownish spots below the insertion of the antennæ. Thorax black; median orange-red area lacking; prothorax has the sides yellow and there are two widely separated transverse dull yellowish spots near the posterior margin; usually the outer angle of the scapulæ has a yellow spot in front of the tegulæ. Stigmal club surrounded by a very narrow clouded area.

Abdomen shorter than in the female, somewhat compressed, seen from above distinctly clavate, yellow beneath, black above, tip orange yellow.

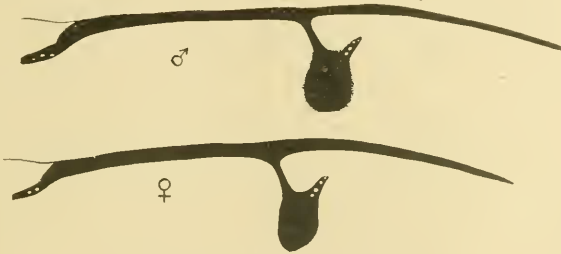


Fig. 4. *Megastigmus pinus*.

This species was first described by Parfitt from females only reared from seeds of *Picea bracteata*, *Pinus Abies nobilis*, and a new species of *Thuja* from California. In a later article he described the male reared from another lot of seeds. Mr. Charles O. Waterhouse of the British Museum has very kindly sent me four specimens which he had carefully compared with Parfitt's types. He also sent me three male specimens of *M. spermotrophus* which he had found to agree with the types from which Parfitt drew his description of the male of *M. pinus*. Ashmead seems to have been misled by this description of the male of *M. spermotrophus* as the male of *pinus* when he states (Chalcis-flies, p. 244) that the two species are identical.

2 ♀, 2 ♂ C. O. Waterhouse (Col. British Museum); 16 ♀, 10 ♂ reared from cones of *Abies nobilis*, Astoria, Oregon. No. 5818, Nat. Mus. The following specimens were reared by

Mr. Herman Borries, of Copenhagen, from seeds from the Western United States: 3 ♀ reared from *Abies magnifica* and *concolor*; 1 ♀, 1 ♂ from *A. grandis*; 2 ♀, 1 ♂ from *A. amabilis*. I have also examined the following specimens from the U. S. Bureau of Entomology through the kindness of Mr. S. A. Rohwer. 15 ♀ and 12 ♂ reared from the seeds of *Abies magnifica* from Tahoe, Calif. National Forest. 2 ♀ and 6 ♂ reared from the seeds of *Abies concolor* from Sierra, Calif. National Forest, 30 May, 1912, collected by J. M. Miller. The specimens from *A. concolor* are somewhat smaller and generally darker in coloration.

The female reared from *A. grandis* by Borries may represent a distinct species but it is impossible to decide from such scanty material. The yellow area on the prothorax is very large, covering nearly the whole dorsal aspect and on the vertex there is on each side a branch of the circumorbital yellow band which curves around behind the lateral ocellus. The male is not in good condition for study.

Megastigmus tsugæ n. sp.

Female.—Length, 2.5 mm.; abdomen, 1.1 mm.; ovipositor, 1.8 mm.

Face and cheeks yellow; occiput, vertex and front black; the upper posterior orbits and a spot at the upper angle of the eye yellowish brown. Antennal grooves black. Prothorax black with two angular, widely separated dorsal spots and the anterior half of the lateral part yellow. Rest of the thorax shining black. Mesonotum and scutellum finely shingled.



Fig. 5. *Megastigmus tsugæ*.

Scape and pedicel yellow beneath. Anterior coxæ yellow, middle coxæ brownish yellow, posterior coxæ black; rest of legs yellowish; base of femora and band at middle of tibiæ on middle and posterior legs brownish. Wings hyaline; stigmal club not surrounded by a clouded area. Abdomen black with five more or less distinct yellow bands at the sides; tip yellowish. Ovipositor black.

Described from 2 females reared by Mr. Herman Borries from seeds of *Tsuga Mertensiana hookeriana* from the Western United States. Type in the U. S. National Museum.

***Megastigmus lasiocarpæ* n. sp.**

Female.—Length, 3.7 mm.; abdomen, 1.5 mm.; ovipositor, 3. mm.

Thorax and abdomen black. Face and partial ring around eye yellow, a pair of large triangular brownish spots on the face; rest of head black. An elongate light yellow spot on the side of the prothorax. Transverse lateral spots on the sides of abdomen yellow. Head finely rugulose with the lines radiating from the mouth and ocelli. Thorax transversely finely rugulose and shingled.

Antennæ brownish black, scape and pedicel yellow beneath. Legs brownish, posterior femora black except at tip. Anterior coxæ yellow, black at base, the other coxæ black. Wings hyaline; stigmal club not surrounded by a clouded area.

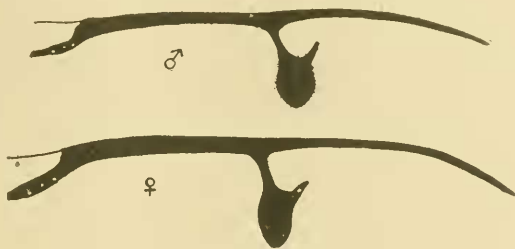


Fig. 6. *Megastigmus lasiocarpæ*.

Male.—Length, 2.4 mm.; abdomen, 1 mm.

Vertex, upper part of occiput and front half way to base of antennæ, black; face, cheeks, lower occiput and a narrow spot along upper eye-margin, yellow. Whole dorsal aspect of thorax black; the yellow spot on side of prothorax is larger than in female. Abdomen black.

Antennæ brownish, scape yellow in front, pedicel nearly black above. Front coxæ yellow, middle coxæ yellow, blackish at base, hind coxæ black. Legs yellowish, suffused with brownish distally; posterior femora brownish on outer surface. Stigmal club darker than in female and more nearly circular.

Described from 2 ♀ 1 ♂ reared from seeds of *Abies lasiocarpa* kindly sent me by O. S. Mackelfresh, from Rye, Colorado, 5 June, 1909.

***Megastigmus spermotrophus* Wachtl.**

Megastigmus spermotrophus Wachtl. Wien. Ent. Zeit., XII, p. 24. 1893.

Megastigmus pinus Parfitt. Zoologist, XV, p. 5731. 1857 (Male only).

Megastigmus spermotrophus MacDougall. Trans. Roy. Arbor. Soc., XIX, pp. 52–65. 1906. Figure and account of habits.

Megastigmus spermotrophus Crosby. Cornell Exp. Sta. Bull. 265. pp. 379–380. Figs. 85–89. 1909.

Megastigmus spermotrophus Rohwer. U. S. Bur. Ent., Tech. Bull. 20, pt. VI, p. 160. 1913.

Female.—Length, 3–3.5 mm.; abdomen, 1.8 mm.; ovipositor, 1.6 mm.

General color a yellowish brown. Face and cheeks lighter than the vertex. Face with fine lines radiating from the clypeus; vertex and thorax finely transversely rugulose. Head and thorax clothed with stiff black hairs arising from black tubercles. Median area on postscutellum, greenish yellow. Propodeum with a distinct median carina.

Antennæ brownish, scape yellow beneath, pedicel nearly black above. Legs including the coxæ paler than the thorax. The posterior coxæ clothed with stiff light-colored hairs, arising from black tubercles. Wings hyaline; stigmal club not surrounded by a cloud; stigmal vein as long as the width of club.

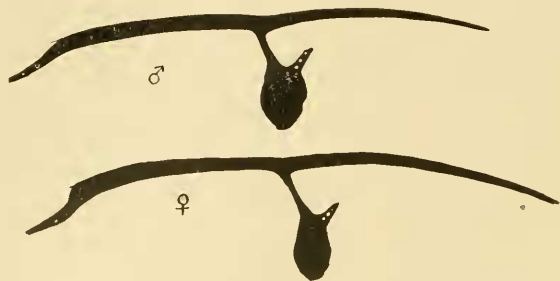


Fig. 7. *Megastigmus spermotrophus*.

Male.—Length, 2.9–3.3 mm.; abdomen, 1.2–1.7 mm. (Measurements taken from alcoholic specimens.)

Head, thorax and legs a clearer yellow than in the female. On the front of the pronotum a dark brown spot is sometimes present which is sometimes divided into two. Sometimes the front of the mesothorax is black and shows through the posterior edge of the prothorax. Median and anterior portion of the propodeum black; sides and posterior margin yellow. Stigmal club darker than in female, not surrounded by a clouded area.

Abdomen brownish yellow, black at base above.

Described from numerous specimens of both sexes reared from seeds of the Douglas Fir sent me by Mr. John Crozier, of Aberdeenshire, Scotland.

The egg as obtained by dissection of the female is white, smooth and spindle-shaped with a very long pedicel at the anterior end and the vestige of one at the opposite end. Length of body of egg, .36 mm.; tail like process, .9 to 1.2 mm.

The full grown larva is yellowish white with brownish mouthparts; its length varies from 2.5 to 3.5 millimeters. The surface is smooth without apparent sculpture and the hairs are very sparse and microscopic in size. The inner margin of the mandibles is provided with three sharp teeth.

The pupa is yellowish white and in the female has the ovipositor curved over the back and reaching to about the middle of the thorax. Length of female pupa, 3 mm.; of male, 2.5 mm.

While originally a native of the Western United States it has been introduced into Europe and has there become a serious pest. The male of this species was described by Parfitt in 1857 as the male of *M. pinus*. Mr. Charles O. Waterhouse of the British Museum has kindly sent me three males of this species which he compared with Parfitt's types. Saftro (Jour. Ec. Ent., VI, p. 283. 1913.) records rearing this species from seed of Douglas Fir in Washington.

The species listed under B in Riley's article (Proc. Ent. Soc. of Wash, II, p. 360) also belong to this species. They were reared from seeds of *Pseudotsuga douglassi*, [*taxifolia*], *Abies magnifica*, *A. grandis*, *A. amabilis* and *A. concolor*.

Through the kindness of Mr. S. A. Rohrer I have been able to examine specimens from the U. S. Bureau of Entomology as follows: 4 ♀ 4 ♂ reared from seed of *Pseudotsuga taxifolia* from Yreka, Calif., April and May. 3 ♀ 2 ♂ reared from seed of *Abies magnifica* from Tahoe, Calif. National Forest, June, 1912; 1 ♀ 1 ♂ from seeds of *Abies concolor*, from Sierra, Calif. National Forest (J. M. Miller, Collector).

Megastigmus aculeatus Swederus.

- Pteromalus aculeatus* Swederus. Vetensk. Akad. nya Handl., XVI, p. 221. 1795.
Torymus collaris Boheman. Vetensk. Akad. nya Handl., LIV, p. 332. 1833.
Megastigmus transversus Walker. Ent. Mag. I, p. 117. 1833.
Torymus punctum Förster. Beitr. Monogr. Pteromal, p. 29. 1841.
Megastigmus vexillum Ratzeburg. Ichn. d. Forstinsect. II, p. 182. 1848.
Megastigmus transversus Reinhard. Berl. Ent. Zeitschr., I, p. 76. 1857.
Megastigmus flavus Förster. Verh. Nat. Ver. preuss. Rheinl. XVI, p. 109. 1859.
Megastigmus collaris Mayr. Verh. zool.-bot. Ges. Wien. XXIV, p. 137. 1874.
Megastigmus aculeatus Thomson. Hymen. Scand. IV, p. 1. 1875.
Megastigmus cynorrhodi Perris. Ann. Soc. Ent. Fr., 1876, p. 222.
Megastigmus aculeatus Cameron. Trans. Ent. Soc. Lond., 1879, p. 118.
Megastigmus collaris Wachtl. Wien. Ent. Zeit., III, pp. 38, 39. 1884.
Megastigmus aculeatus Crosby. (In part). Cornell Exp. Sta., Bull. 265, pp. 377-379. 1909.

Female.—Length, 3 mm.; abdomen, 1.5 mm.; ovipositor, 4 mm.

General color brownish yellow. Face and cheeks yellow; vertex brownish yellow; occiput with a narrow band of black above the opening. Pronotum pale yellow behind, mesonotum black in front where it shows through the thin posterior edge of the pronotum, the anterior half reddish yellow; axillæ black except the inner angle; anterior half of the propodeum black or dark brown. Median carina of propodeum not pronounced. Median part of the postscutellum greenish yellow.

Antennæ very dark brown, nearly black, scape beneath yellow. Legs yellow, wings hyaline. Stigmal club oval, not surrounded by a cloud, the stigmal vein shorter than the width of club.

Abdomen brownish yellow on the sides, dark brown above banded with yellow. Ovipositor longer than body, black and curved.

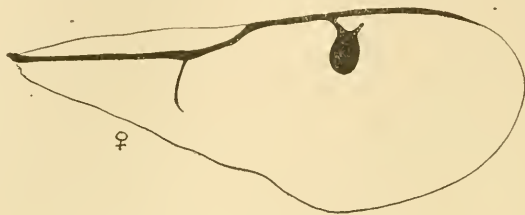


Fig. 8. *Megastigmus aculeatus*.

Described from numerous specimens reared from rose seeds at Ithaca, N. Y. In Bull. 265, Cornell Exp. Sta. I have confused this species with *M. nigrovariegatus*. All the other localities there given refer to that species. Figures 82 and 83 are also of *nigrovariegatus*. In the collection of the U. S. National Museum there is a series of specimens reared from rose seeds imported from Peking, China. I have also reared several specimens from rose hips from Heilbronn, Germany, procured for me by Mr. Carl Ilg from his friend, Mr. Gustav Wieland.

***Megastigmus flavipes* Ashmead.**

Megastigmus flavipes Ashmead. Trans. Am. Ent. Soc. XIII, p. 128. 1886.

"Male.—Length, .12 inch. Head and thorax bright golden green, face finely reticulately strigose; thorax irregularly, transversely, coarsely strigose; antennæ clavate, scape and flagellum beneath yellow, flagellum above brown-black; the collar is rather short; the scutellum at tip is divided by a transverse suture and with a raised rim at border posteriorly; abdomen ovate, black; legs waxy yellow; wings hyaline, veins pale, excepting the stigmal vein, which is brown, and ends in a circular stigma.

"Described from one specimen taken in August."

In the United States National Museum collection there is the pin on which the type was originally tag-mounted. Only the hind legs and one front wing remain. The stigmal club is large, very dark colored and appears to be surrounded by a narrow clearly defined cloud.

In 1888 (Bull. 3, Kansas Agricultural Experiment Station, p. III) Ashmead described another species under the same name, *Megastigmus flavipes*. Through the kindness of Professors T. J. Headlee and G. A.

Dean, I have been able to examine the type of this species. It is a male *Torymus*. As the original description is rather brief I will publish a more complete description elsewhere.

***Megastigmus albifrons* Walker.**

Megastigmus albifrons Walker. Trans. Ent. Soc. London, 1869. p. 314.

Female.—Length, 5 mm.; abdomen, 2 mm.; ovipositor, 4 mm. (abdomen contracted in drying).

Head yellowish white, with many black punctures from which arise black hairs; on the middle of the face the hairs are yellowish; an area including the ocelli and extending almost to the eye margin, black.

Prothorax dull yellowish, the dorsum marked with a wedge-shaped black spot from the front corner of which a black line curves around along the lateral margin and almost reaches the posterior edge of the segment. Central lobe of the mesonotum black except along the lateral edge; lateral lobes brownish, blackish in the center. Scutellum black except along side and at apex where it is yellowish brown. Axillæ black in the center, surrounded by yellowish brown. Post scutellum yellowish white in the center, black on the sides. Propodeum black, yellowish white at the sides. Pleuræ yellowish white.



Fig. 9. *Megastigmus albifrons*.

Antennæ brownish, scape yellowish at base and below. Legs yellowish brown; tarsi blackish at tip. Front wings hyaline with a distinct brownish spot adjoining the hind margin of the submarginal vein beyond the junction with the basal vein. Basal vein unusually distinct. Stigmal club surrounded by an indistinct clouded area scarcely discernible when viewed with a hand lens.

Abdomen shining black above, spotted with dull-yellowish on the sides and below. Ovipositor black, the extreme tip yellowish.

Male.—Length, 6 mm.; abdomen, 2.5 mm.

Head similar to female. Thorax dull yellowish marked with a black median line, enlarged in front on the prothorax, narrower on the median lobe of the mesothorax and again enlarged on the scutellum. The lateral black marking on the prothorax of the female is here replaced with brownish.

Mesonotum distinctly brownish. Axillæ black along the anterior margin. Legs more distinctly brownish than in the female. In the fore wing the brownish spot adjoining the submedian vein is more distinct than in the female, and the stigmal club is surrounded with a distinct clouded area.

Abdomen shining black above, brownish yellow below.

Described from 1 ♀ and 1 ♂. Placerville, Cal., 8 Feb., 1913. Reared by J. M. Miller from the seeds of *Pinus ponderosa*. Received through the kindness of S. A. Rohwer.

Megastigmus canadensis Ashmead (Trans. Am. Ent. Soc., XIV, p. 186. 1887).

The type in the United States National Museum is a male Pteromalid.

Through the kindness of Dr. Henry Skinner, I have been permitted to examine specimens of the two following species in the collection of the American Entomological Society.

M. cecidomyiæ Ashmead (l. c. XIV, p. 185. 1887).

Two specimens, male and female, both tag-mounted on the same pin, "E. Fla., Ashmead" and labeled with the name in Ashmead's hand-writing. They belong to the genus *Lochites*.

M. ficigeræ Ashmead (l. c. IV, p. 185. 1887). One male. The head is glued to the card point separately. The antennæ are lacking. It is apparently an Encyrtid. "E. Fla. Ashmead." Name in Ashmead's handwriting.

These specimens were probably the ones from which Ashmead drew up his description of the species.

In 1892 C. V. Riley received a series of specimens of *Megastigmus* reared from the seeds of various conifers by Mr. Herman Borries, of Copenhagen, Denmark. He published (Proc. Ent. Soc. Wash. II, pp. 359-363) an article on the habits of this genus in which he gave a list of the specimens reared by Mr. Borries and data in regard to the host plants. I have examined these specimens in the National Museum Collection and for convenience quote the list and indicate the species to which each lot belongs.

"A. Very handsome species marked with black, red, and yellow. II and V from *Abies magnifica* and *concolor*, somewhat smaller and paler; III, from *A. grandis*, distinctly smaller, much paler; IV, from *A. amabilis*, larger and darker. ♂ and ♀ of all varieties. [*M. pinus* Parfitt.]

"B. Entirely yellow species, also variable; perhaps two species mixed. I, from *Pseudotsuga douglassi* [*taxifolia*] ♂ and ♀; II, from *Abies magnifica*; III, from *A. grandis*; IV, from *A. amabilis*; V, from *A. concolor*. [*M. spermotrophus* Wachtl.]

"C. Very small, dark species, very similar to small specimens of the European *M. strobilobius*. From *Tsuga* [*mertensiana*] *hookeriana*. 2 ♀ [*M. tsugæ* n. sp.]

"D. Entirely black species from Japan. From *Abies mariesi* 2 ♀. [*M. borriesi* n. sp.]

"E. *M. strobilobius* Ratzeb. from Denmark. 5 ♀."



Fig. 10. *Megastigmus borriesi*.

**Megastigmus borriesi* n. sp.

Female—Length, about 3.3 mm.

Head, thorax and abdomen dark brown, nearly black; yellowish around mouth. Antennæ of the type still in pupal sheaths. Scape brownish lighter beneath. Legs brownish yellow, the posterior femora darker. Coxæ dark brown like the thorax. Wings hyaline, the stigmal club without a surrounding cloud. Ovipositor as long as abdomen.

Described from two females in rather poor condition. Reared by Mr. Herman Borries from seeds of *Abies mariesi* from Japan.

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TABLE OF HOSTS.

- M. aculeatus* Swederus—Rose seeds.
- M. albifrons* Walker—Seeds of *Pinus ponderosa*.
- M. brevicaudis* Ratzeburg—Seeds of Sorbus.
- M. borriesi* Crosby—Seeds of *Abies mariesi* from Japan.
- M. flavipes* Ashmead—Unknown.
- M. lasiocarpæ* Crosby—Seeds of *Abies lasiocarpa*.
- M. nigrovariegatus* Ashmead—Rose seeds.
- M. physiocarpæ* Crosby—Seed capsules of *Physocarpus opulifolius*.
- M. pinus* Parfitt—Seeds of "*Picea bracteata*," *Abies nobilis*, *Abies magnifica*, *Abies concolor*, *Abies grandis*, *Abies amabilis*.
- M. spermotrophus* Wachtl—Seeds of *Pseudotsuga taxifolia*, *Abies magnifica*, *Abies grandis*, *Abies amabilis*, *Abies concolor*.
- M. tsugæ* Crosby—Seeds of *Tsuga mertensiana hookeriana*.

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